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Abstract

CURRENT STATUS AND FUTURE PROSPECTS FOR COMMERCIAL RADIATION PROCESSING

Joseph E. Machurek, (U. S. Atomic Energy Commission)
Martin H. Stein, (U. S. Atomic Energy Commission)

Over the last decade, considerable attention has been given by researchers throughout the world to the possibility of utilizing massive amounts of ionizing radiation for industrial processing. After years of research by a countless number of organizations commercial radiation processes are beginning to appear.

This paper discusses the processes in use today in the United States in some detail. Future commercialization is also considered, including those processes that probably will become successful within the next few years. The former category includes the production of ethyl bromide, polyethylene film, crosslinked polyethylene wire and related products, semi-conductors, medical supply sterilization and sprout inhibition of potatoes. When possible, data are presented on volume production and present and future market implications.

Future processes discussed are the radiation curing of coatings, textile materials, wood plastic combinations, sterilization of meat products, pasteurization of fishery and fruit products, the use of radiation for food processing, semi-conductor devices, and other specialized radiation processes. Consideration is given to various types of irradiators - i.e., for package, bulk, liquid and solids - including discussion of design parameters and their importance.

Radiation sources as they relate to these design parameters are also considered. The potential use of cobalt-60, cesium-137 and strontium-90, and their production, encapsulated form, and present and ultimate costs are discussed in some detail.

The present and ultimate economics of radiation processing are presented, taking into account all of the previously discussed topics, present plans, and research for the future, including the use of accelerators as radiation sources.

The process radiation industry, although at present in its infancy, is beginning to take shape. It is important that these major factors affecting the industry are well understood so that the vast potential of this field will be realized.